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Economic Impact of the Citizens' Initiative to Promote Forest Rehabilitation and Eliminate Clearcutting, 1996

Maine Department of Agriculture, Conservation and Forestry

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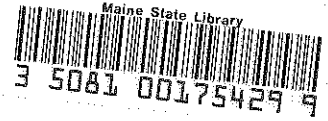
ECONOMIC IMPACT

OF THE

CITIZENS' INITIATIVE
TO PROMOTE
FOREST REHABILITATION
AND
ELIMINATE CLEARCUTTING

An Analysis by:

Maine Forest Service
State Planning Office

July 3, 1996

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ECONOMIC IMPACT OF THE

CITIZENS' INITIATIVE TO PROMOTE FOREST REHABILITATION

AND ELIMINATE CLEARCUTTING

EXECUTIVE SUMMARY

Introduction

In an effort to provide information to Maine citizens about the November referendum - *A Bill to Promote Forest Rehabilitation and Eliminate Clearcutting*, the Maine Forest Service and the State Planning Office have conducted an analysis to determine the impacts of the referendum on projected timber supply, and estimate the overall impacts on Maine's economy. While public interest in forest practices is much broader than timber supply and the economy, the purpose of this report is to forecast how wood supply, forest-based manufacturing, and the economy of Maine might be affected by this major change in forest policy. This analysis does not address any biological or ecosystem issues, impacts on forest-based recreation, or changes to the economic return of owning forest land.

Referendum Provisions

In addition to banning clearcutting, the referendum language imposes three new forest management standards that control all timber harvesting in the unorganized towns and plantations of Maine (an area that includes 57% of the State's 17.7 million acres of forest land). The combined net effect of the proposed forest management standards require that all harvest sites contain a high tree volume before they are legal candidates for harvesting, and harvest volume is limited to one-third of the total volume.

Structure of the Analysis

This analysis consists of: 1) a timber harvest and supply analysis to estimate sustainable harvest levels using current forest management intensities and regulatory structure, and to determine the effects of the referendum requirements on future wood supply, 2) an analysis of available timber supply, market responses, and changes in wood cost in response to the referendum, and 3) an economic forecast of the impacts on Maine's overall economy resulting from changes in wood supply and cost.

Time frame of the analysis

The initial period following the referendum passage will be characterized by short term market adjustments that attempt to satisfy current demand, but are not sustainable in the longer term. This analysis does not try to forecast all short term adjustments to satisfy current wood supply. Rather, it focuses on estimating the permanent changes in harvest levels and wood supply precipitated by the referendum's approval.

Results
Timber Harvest Analysis - Assessing the Impacts of the referendum on harvest levels.

1. The Maine Forest Service estimates the total reduction in the annual timber harvest in the LURC jurisdiction as a result of the referendum to be 1.78 million cords of spruce-fir and hardwood combined. This reduction in annual harvest from LURC jurisdiction alone represents a 36% decline in the current state wide harvest for these two species, compared to the current annual harvest of 4,950,000 cords.

2. Using current growth rates, management intensities, and regulatory structure, the long-term sustainable harvest levels in the LURC jurisdiction are 2.0 million cords per year of spruce-fir and 0.8

million cords per year of northern hardwood, compared to current annual harvest levels of 1.75 million cords of spruce-fir and 1.0 million cords of northern hardwoods.

3. The harvest allowed by the referendum requirements for these two species groups within LURC jurisdiction is 0.75 million cords of spruce-fir and 0.4 million cords of northern hardwoods.

   Imposing the referendum requirements on LURC jurisdiction has the net effect of reducing the allowable annual harvest in LURC jurisdiction of spruce-fir by 57% during the first 30 years (from 1.75 million to 0.75 million cords), and northern hardwoods by 60% (from 1.0 million to 0.4 million cords), from current harvest levels.

4. Using current growth rates and management intensities, the long-term sustainable harvest levels in the organized towns are 0.6 million cords per year of spruce-fir and 1.0 million cords per year of northern hardwoods, compared to current annual harvest levels of 0.4 million cords of spruce-fir and 1.2 million cords of northern hardwoods.

Timber Supply and Wood Cost Analysis

The market will find ways to make up some of the 36% shortfall in state wide supply - by increasing prices of mill delivered wood sufficiently to raise imports to Maine and lower exports out of Maine. The state wide supply of spruce-fir and hardwood, after market forces raise imports and lower exports, is projected to be 3,580,000 cords, 19% less than current demand. 32% of the projected supply is expected as imports, compared to the current import rate of 18% of total supply.

While short term market response will include increased harvesting in the organized towns, this analysis demonstrates that overall harvest levels in the organized towns are currently at sustainable levels. Left to its own, the market will experience a period of over harvesting in organized towns as it tries to compensate for lost supply in the LURC jurisdiction. Increased harvesting for a period of more than a few years is unlikely to be tolerated by local and state policy makers. In any case, the over harvesting could not continue indefinitely. Therefore it is deemed inappropriate for this analysis to incorporate any additional harvesting in the organized towns to satisfy wood shortfall needs created by enforcing the referendum's provisions in the LURC jurisdiction.

As the market adjusts to a reduced supply of wood and to new logging standards, it is estimated that the mill delivered price of wood for the paper and lumber manufacturing sectors will increase 17%.

Economic Impact Analysis
Assessing the impact of changes in wood supply and wood cost on Maine's overall economy

The Maine State Planning Office used the two variables cited above, a 17% price increase for mill delivered raw material to the paper and lumber sectors, and a 19% shortfall in available wood supply, as input variables to run a simulation of the referendum's effect on the future Maine economy.

An independent advisory panel of five economists reviewed the assumptions used to quantify and model the referendum's direct economic impacts.

The table below summarizes the annual economic impacts that would be felt by the Maine economy as a result of the referendum's passage, beginning in 1997. The projected baseline level for these economic variables, without a

referendum passage, as well as the percentage change, are provided so that the relative scale of the impact can be judged.

Table 1: Economic Impacts	LUMBER SECTOR	PAPER SECTOR	ALL OTHER SECTORS	TOTAL MAINE ECONOMY
Projected 1997 Employment Level	15,000	15,000	695,000	725,000
Impact on Employment (# of jobs)	-3,800	-3,200	-8,600	-15,600
Impact on Employment (%)	-25%	-21%	-1%	-2%
Projected 1997 Wage & Salary Level	$265 million	$700 million	$10.4 billion	$11.4 billion
Impact on Wage & Salary	-$68 million	-$166 million	-$205 million	-$439 million
Impact on Wage & Salary (%)	-26%	-24%	-2%	-4%
Projected 1997 Output Level (in '87$)	$837 million	$2.8 billion	$35.2 billion	$38.8 billion
Impact on Output (in '87$)	-$213 million	-$645 million	-$490 million	-$1.3 billion
Impact on Output (%)	-25%	-23%	-1%	-3%

Key Economic Impacts

The estimated annual employment level would fall by 15,600 jobs (-2%) for the entire Maine economy, (3,800 jobs in Maine's lumber sector, 3,200 jobs in Maine's paper sector, and 8,600 jobs in all other sectors). Annual wage and salary for the entire Maine economy would decline by $439 million (-4%). Total Output would decline by $1.3 billion (-3%).

Longer Term Economic Impacts

The panel of economists identified longer term economic impacts that, although difficult to quantify, are significant:

1. Over the longer term (10+ years), the adverse cost and supply factors created by the referendum will discourage future investments by the lumber and paper sectors. Maine is one region among many in North America and the world from which industry (both lumber and paper sector firms) can choose when planning future capital investments. If similar restrictive regulations were applied across a much wider region, such as across all of North America or across all of northeastern Canada and the United States, then Maine would not be placed on a singularly unlevel "playing field". Since this is not the case however, the unique position imposed on Maine by the referendum will adversely impact the ability of Maine firms to compete in a global marketplace.

2. Maine has an older than average set of capital equipment on hand for production. It is likely that additional future jobs will be lost in Maine as industry allows their capital stock to be drawn down, and as investments in new capital equipment are made in other more competitive regions.

Economic Impact of the
Citizens' Initiative to Promote Forest Rehabilitation
and Eliminate Clearcutting

Introduction

A citizen initiated referendum to create new forest practices regulations affecting the unorganized townships and plantations of Maine (LURC jurisdiction) will appear on the November 5, 1996 ballot. The referendum language raises many important public policy issues regarding the regulatory control exerted by the state over privately owned forest land. The purpose of this analysis is to assess and estimate the economic consequences of the proposed harvest restrictions on wood availability to Maine's wood using industry. This analysis addresses only the economic implications of the referendum language on wood supply - it does not address any biological or ecosystem impacts, impacts to forest based recreation, nor does it assess changes in the economics of owning and managing forest lands.

The analysis is conducted in three parts: 1) a timber harvest and supply analysis to estimate sustainable harvest levels using current forest management intensities and regulatory structure, and to determine the effects of the referendum requirements on future timber harvest, 2) an analysis of available timber supply, market responses, and changes in wood cost in response to the referendum, and 3) an economic forecast of the impacts on Maine's overall economy resulting from changes in wood supply and cost.

Key Referendum Provisions

The referendum proposes new forest harvest standards and restrictions. A summary of the full language and interpretation is available from the Maine Forest Service in an earlier document. For this analysis, only those provisions of the referendum that directly control and limit harvest volume removals have been incorporated. The analysis did not assess impacts resulting from the elimination of clearcutting, requirements for slash dispersal, limitations of opening size, nor the requirement to retain the maximum diversity of tree species, size, and age classes. In summary, the referendum language incorporated into this analysis are:

1. Subsection 12-B. Timber harvesting may not remove more than 33% of the volume on any acre in a 15 year period.

2. Subsection 12-C. Following a timber harvesting operation, the postharvest stand of trees must meet residual basal area requirements of 65 square feet or more for hardwood stands, 75 square feet or more for mixed wood stands, 90 square feet or more for softwood stands, or
Considering trees greater than 1 inch in diameter at 4.5 feet above the ground, the residual basal area of the postharvest stand must be calculated using the formula $S+T = R$, where S is the average number of sapling-sized trees per acre in the post harvest stand as a percentage of 1,000 trees per acre, T is the average residual basal area for trees greater than 4.5 inches in diameter as a percentage of the minimum residual basal area requirements for the post harvest stand listed above for hardwood, mixed wood, or softwood stand. R must equal 100% or more.

In general, the net effect of these standards is to require that all harvest sites contain relatively high tree volume before they are legal candidates for harvesting, and timber harvesting volumes are limited to a relatively small amount of the volume in the stand.

The basic analytical tool employed to estimate changes in timber supply is the FORMAINE Wood Supply Model. FORMAINE has been used for previous timber supply modeling in Maine (Seymour & Lemin, 1989). Its main purpose is to project the future development and structure of the forest. Forest inventory data is critical to building the forest structure in the model. Since detailed data required to build a new set of forest types, productivity classes, and age classes from the recently completed 1995 forest inventory will not be available until August 1996, this analysis uses 1980 - 1982 forest inventory data, calibrated to the current forest. This is the same data set that was used in "Timber Supply Projections for Maine, 1980 - 2080" (Seymour & Lemin, 1989). While raw data from the 1995 inventory is unavailable, preliminary summary tables indicate that overall trends in inventory are consistent with earlier projections. It is not expected that the new data will significantly alter the outcome of this analysis.

The Maine State Planning Office uses a computer model of the Maine economy to help derive economic projections. The model is interactive, allowing analysts to modify trends and assumptions and introduce new information to the model. The timber supply projections from the FORMAINE analysis were used to construct a wood supply profile for the paper and lumber and wood products industries as input data to the economic model. Changes in wood cost to the paper and wood products industries are additional inputs to the model and were developed jointly by the Maine Forest Service and the State Planning Office. The economic model estimates the state wide economic consequences of changes in timber supply and changes in wood cost.

SECTION 1.
Timber Harvest Analysis - Assessing the Impacts of the Referendum on Harvest Levels

The FORMAINE analysis of timber supply was limited to the Spruce-Fir and Northern Hardwood forest types. (The northern hardwood species include sugar maple, red maple, yellow birch, beech, oak and ash.) These two species groups represent 61% of the forest resource in the state and 67% of the annual harvest volumes. Pine, hemlock, and the intolerant hardwoods (aspen, white birch) were excluded from the FORMAINE analysis due to the lack of thoroughly researched and documented growth and yield curves for these species.

Modeling strategies were developed to answer these basic questions:
1. what is the long-term sustainable harvest for Spruce-Fir and Northern Hardwoods in LURC jurisdiction using current growth, management intensity, and current regulatory structure?
2. what effects will the referendum requirements have on the long-term sustainable harvest for the LURC jurisdiction?
3. what is the long-term sustainable harvest level in the organized towns using current growth, management intensity, and regulatory structure?

Long-term sustainable harvest is defined as the harvest level at which removals are in approximate balance with total forest growth of that species (Seymour and Lemin, 1989). In this analysis, long-term sustainable harvest was determined by identifying for each species the harvest level at which total inventory remains stable for a period of at least 30 years.

1. Long-term Sustainable Harvests in LURC jurisdiction

Spruce-fir

Using current growth, management intensity, and the existing regulatory structure, the FORMAINE analysis identifies a long term sustainable harvest level for Spruce-fir in the LURC jurisdiction of 2.0 million cords. At this harvest level, spruce-fir inventory declines 8% to 4,825 million cubic feet (57 million cords) in 2005, and stabilizes at about 5,550 million cubic feet (65 million cords) beginning in 2030.

Figure 1. Determining sustainable harvest levels using long term inventory trends.

Spruce-Fir in LURC jurisdiction - no referendum restrictions

Spruce-Fir LURC
Sustainable harvest level = 2.0 million cords

◇ 1.75 MM CORDS   ▲ 2.0 MM CORDS
● 2.25 MM CORDS   ★ 2.5 MM CORDS
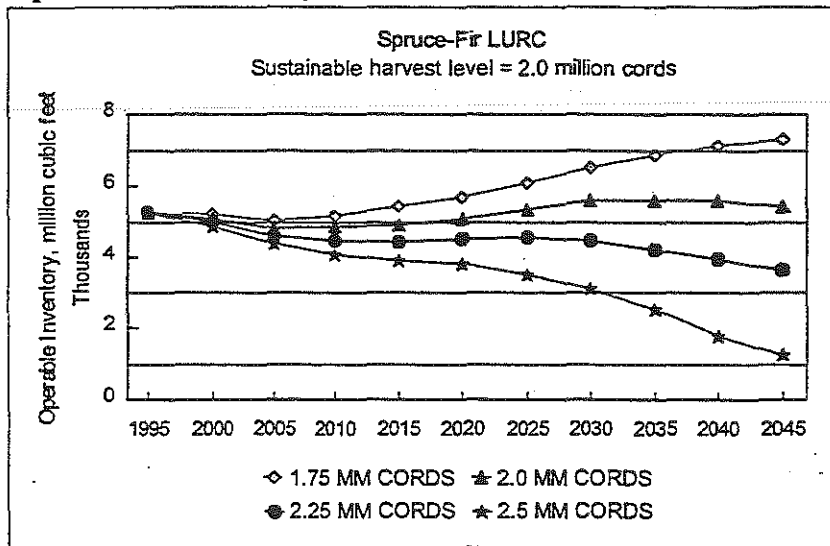
The average harvest of spruce-fir in LURC jurisdiction for the period 1990 - 1994 is 1.75 million cords annually, 87.5% of the calculated long term sustainable harvest level.

Northern Hardwoods

Using current growth, management intensity, and the existing regulatory structure, the FORMAINE analysis identifies a long term sustainable harvest level for Northern Hardwoods in the LURC jurisdiction of 0.8 million cords. The long-term sustainable harvest level is about 80% of the current harvest level of 1.0 million cords. The model indicates that at the long-term sustainable harvest level, northern hardwood inventory in LURC is stable at about 2,450 million cubic feet (31 million cords) for the 50 year modeling period.

Figure 2. Determing sustainable harvest levels using
        long term inventory trends.
Northern Hardwoods in LURC jurisdiction - no referendum restrictions

Northern Hardwoods, LURC
Sustainable harvest level = 0.8 million cords

Legend:
- 0.75 MM CORDS
- 0.8 MM CORDS
- 0.9 MM CORDS
- 1.0 MM CORDS

Modifications to FORMAINE to include the referendum requirements.
The FORMAINE model was modified to allow harvesting only in stands that are stocked with more than
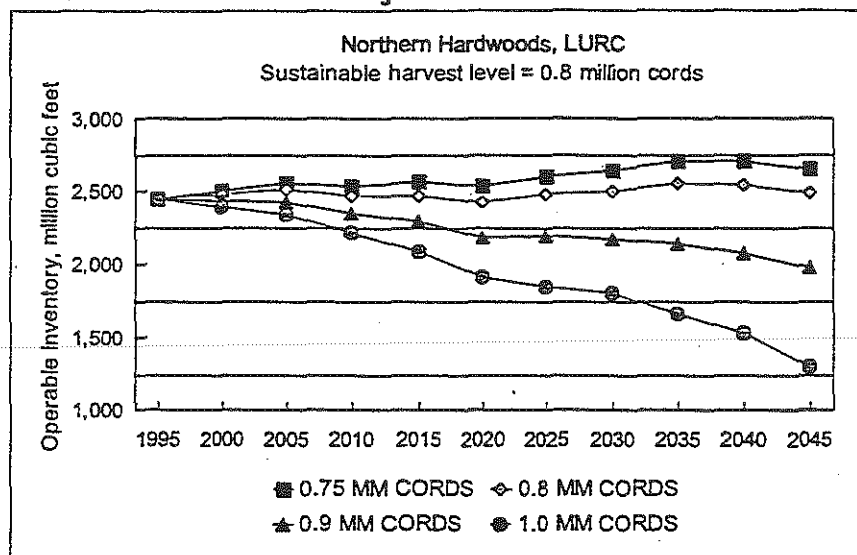the minimum basal area required by the referendum. The model selects stands to harvest if the initial
stocking is more than 90 square feet basal area for softwood stands, and more than 65 square feet basal area
for hardwood stands. The model accumulates volume growth on all stands that are below the minimum
stocking levels and the volume becomes available for harvest when the stand volume exceeds the
minimum stocking levels for the species being modeled.

All stands are harvested using FORMAINE's partial harvest function. The model harvests all of the volume
above the minimum required stocking levels (90 square feet for S/F and 65 square feet for hardwoods),
simulating a harvest that retains the minimum stocking level. The construction of the model does not allow
inclusion of the referendum requirement to harvest no more than 33% of the stand volume. It does include
the 15 year restriction. After a stand is harvested, the model will not select that stand for another harvest
until 15 years have elapsed. Since the model may harvest more than 33% of stand volume in one harvest,
the resulting estimates of the referendum effects on sustainable harvest levels should be viewed as
conservative estimates.

2. Effects of referendum on Long-term Sustainable Harvests in LURC
Spruce-fir
The strategy employed to determine harvest levels allowed by the referendum consists of examining the
trends in operable inventory while running the model at harvest levels ranging from 600,000 cords per year
to 1,000,000 cords per year during the 50 year modeling period. Figure 3-A illustrates the operable
inventory trends for these harvest levels. The goal was to identify the maximum harvest level that
produces a relatively stable inventory. The three harvest levels (600 M, 750 M, and 1,000 M cords per

year) all produce an initial inventory decline during the first ten years. The general growth in inventory after 2020 for all three trial harvest levels indicates that spruce-fir should accumulate enough growth in the future to allow higher harvest levels after 2020. The challenge is to choose a harvest level that maintains a stable long-term inventory.

The curve "Allowed under Referendum" in Figure 3-B shows the inventory trend that results from an annual harvest of 750,000 cords during the first 29 years of the analysis. After 30 years, inventory is sufficient to provide an annual harvest of 1 million cords for years 30 - 39, and 1.5 million cords for years 40 - 50.

Figure. 3-A. To determine the optimal harvest level of Spruce-Fir in LURC jurisdiction allowed under the referendum.
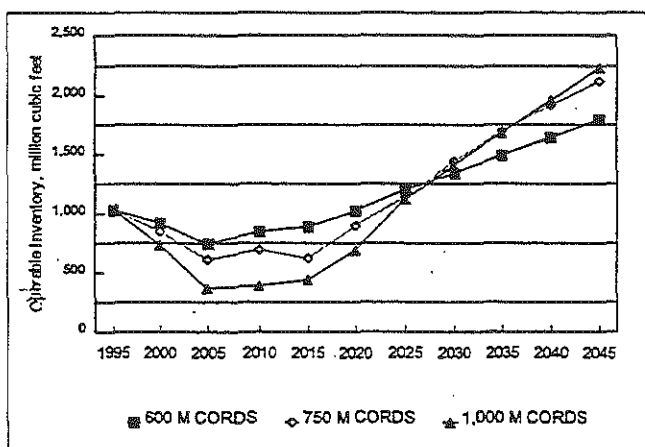
Figure 3-B. Impact on Spruce-Fir inventory in LURC jurisdiction of the harvest level allowed under the referendum.
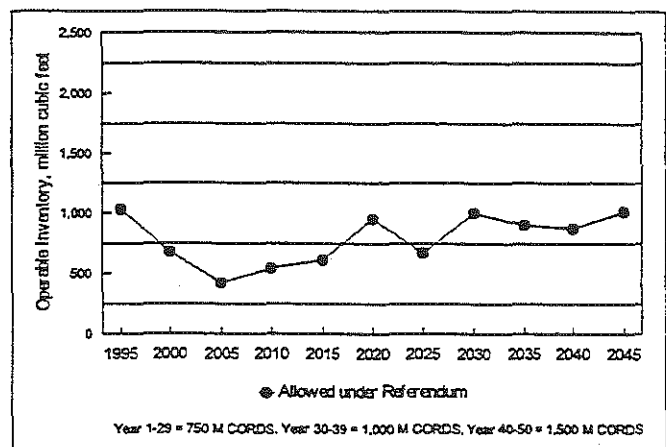
For the first 30 years of the analysis, the harvest level allowed under the referendum in LURC is 37% of the long-term sustainable harvest, and 43% of current harvest levels. The referendum reduces the current inventory of spruce-fir that is <u>available for harvest</u> from 5,300 million cubic feet (see Figure 1) to 1,000 million cubic feet (see Figures 3-A and 3-B).

When operating under the referendum provisions, the FORMAINE model selects a stand for harvesting <u>only if</u> the stand volume is more than 90 square feet for spruce-fir stand and more than 65 square feet for hardwood stands. Consequently, operable inventory is a measure of the cumulative volume of those stands that meet or exceed the referendum's minimum stocking requirements and which, by definition in the referendum, can be legally harvested. This means that the model carries and accumulates growth on approximately 4,300 million cubic feet of spruce-fir, but this "hidden" inventory is unavailable to harvest from.

<u>Northern Hardwoods</u>
FORMAINE identifies a harvest level allowed under the referendum for northern hardwoods in LURC jurisdiction of 400,000 cords annually. This is 40% of the current harvest levels, and 50% of the long-term sustainable harvest identified by FORMAINE without referendum restrictions. Trial runs with higher harvest levels produced multiple harvest shortfalls.

Figure 4 summarizes for Spruce-Fir and Northern Hardwoods in LURC jurisdiction, the current harvest levels, the long-term sustainable harvest levels using current management and regulations, and the harvest levels allowed under the referendum provisions.

Figure 4. Current Annual Harvest, Long-term Sustainable Harvests with current management and regulations, and Projected Harvest Levels allowed under the referendum for Spruce-Fir and Northern Hardwoods in LURC jurisdiction.
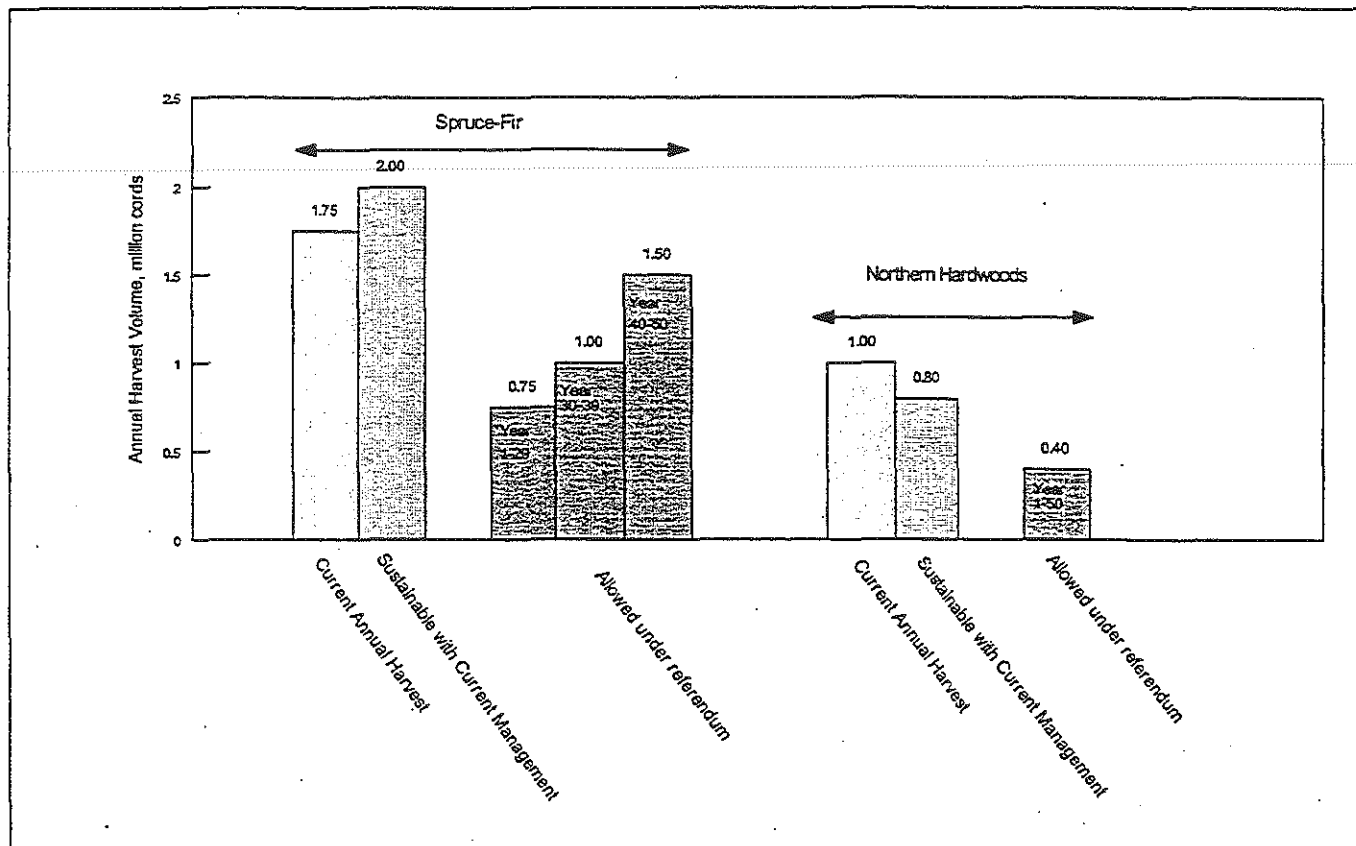
FORMAINE modeling identified significant reductions in harvest levels of spruce-fir and northern hardwood in LURC jurisdiction in response to the requirements of the referendum. The spruce-fir harvest declines 57% from 1,750,000 cords annually to 750,000 cords annually. Modeling indicates that the annual harvest of northern hardwoods is approximately 25% higher than the long-term sustainable level of 800,000 cords. However, the referendum requirements reduce the annual harvest to 400,000 cords, only 50% of the long-term sustainable harvest.

3. Long-term Sustainable Harvests in the Organized Towns

Current annual harvest levels in the organized towns for Spruce-Fir and Northern Hardwoods are 400,000 cords and 1,200,000 cords, respectively. Modeling with FORMAINE identified long-term sustainable harvest levels of 600,000 cords for Spruce-Fir and 1,000,000 cords for Northern Hardwoods. This analysis indicates that the organized towns could produce 50% more spruce-fir volume than is currently produced.

The analysis also indicates that long term sustainable harvest for northern hardwoods in the organized towns is about 83% of current harvest levels. A similar trend was identified in the LURC jurisdiction. This finding is consistent with previous timber supply projections for the state (Seymour and Lemin, 1989). Clearly there is a need to improve hardwood growth rates if current harvest levels are to be sustained. Without management initiatives to improve hardwood growth rates, harvest levels of northern hardwoods must be reduced 20% to be sustainable. Figure 5 summarizes current and long-term sustainable harvest levels for both species in the organized towns.

Figure 5. Comparison of Current Harvest and Long-term Sustainable Harvest for Organized Towns
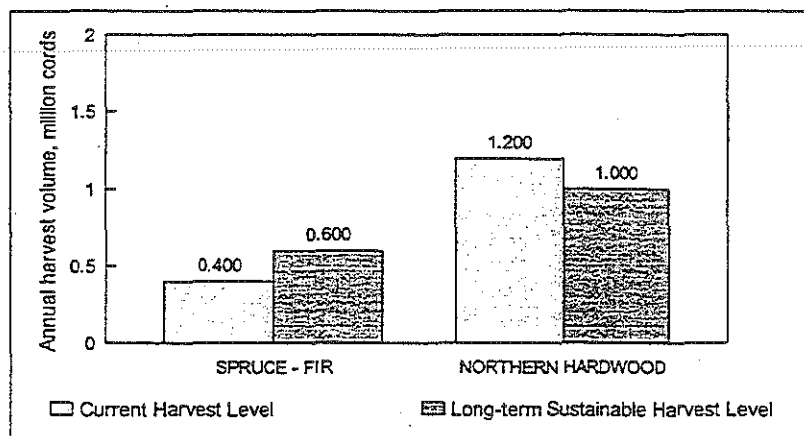
Additional Data on hardwood harvest and consumption
In order to obtain a more complete picture of the supply of hardwood species, intolerant hardwoods must be added to the hardwood species mix. The FORMAINE analysis did not include intolerant hardwoods, which contribute about 600,000 cords to the annual harvest. In projecting statewide wood supply, we assumed that the trends identified for northern hardwoods by modeling with FORMAINE are also valid for the intolerant hardwoods.

Additionally, the data used to estimate annual harvest volumes is derived from the Maine Forest Service annual Wood Processor Report. This data is based on mandatory reporting by all primary manufacturers of wood products, and by all those who export or import unprocessed wood. The Wood Processor Report does not track information on the volume of residential firewood harvested each year. Previous timber supply analysis used an estimate of 700,000 cords of firewood harvested each year. While is fair to assume the volume of firewood has declined in recent years, there are no numbers to confirm this. Any discussion of actual harvest levels must include an additional 700,000 cords of residential firewood.

SECTION 2.
State wide Timber Supply
Assessing available timber supply, market responses, and changes in wood cost.

The preceding discussion explored the relationships between current annual harvest levels and long term sustainable harvest levels statewide for two species groups (spruce-fir and northern hardwoods), and the impact of the referendum on sustainable harvest levels for LURC jurisdiction. If the referendum passes and new timber harvesting standards are enacted for the LURC jurisdiction, it is most likely that over time the harvest of spruce-fir and hardwood in the LURC jurisdiction will decline to the levels identified by the FORMAINE Wood Supply analysis, creating a 1,600,000 cord deficit in the annual harvest of spruce-fir and northern hardwoods.

While short term market response will include increased harvesting in the organized towns, this analysis demonstrates that overall harvest levels in the organized towns are currently at sustainable levels. Left to its own, the market will experience a period of over harvesting in organized towns as it tries to compensate for lost supply in the LURC jurisdiction. Increased harvesting for a period of more than a few years is unlikely to be tolerated by local and state policy makers. In any case, the over harvesting could not continue indefinitely. Therefore it is deemed inappropriate for this analysis to incorporate any additional harvesting in the organized towns to satisfy wood shortfall needs created by enforcing the referendum's provisions in the LURC jurisdiction.

State wide wood supply projections
Maine's forest-based economy derives its wood supply from wood that is harvested in Maine from both the LURC jurisdiction and the organized towns, as well as from wood that is imported into Maine from other states or Canadian provinces. Changes in the supply of wood harvested in Maine that are induced by the referendum will trigger market responses that affect the balance between wood exports and imports. The following sections of this analysis examine: 1) the current and projected harvest volumes, and 2) the current wood supply allocation to Maine's forest-based economy, 3) projected changes in wood cost, and 4) projected wood supply allocation.

1. Current and Projected Harvest Volumes
Table 1 compares the current timber harvest profile for spruce- fir and all hardwoods to the projected harvest profile as a result of the referendum. The following assumptions are used to build the projected harvest profile:
* Intolerant hardwoods are added to the analysis at this point to gain a more complete picture of current supply and demand for hardwood. The reduction in harvest identified by modeling northern hardwoods in LURC (60% reduction in annual volume) is applied to the intolerant hardwoods to estimate the harvest level of intolerant hardwoods allowed by the referendum.
* Harvest levels in LURC jurisdiction will fall to the levels allowed by the referendum.
* Harvest levels in the organized towns are maintained at current levels, in order to confine the timber supply effects of the referendum to LURC jurisdiction.

Table 1. Current and Projected Harvest Volumes for Spruce-Fir and Hardwoods	CURRENT HARVEST PROFILE			PROJECTED HARVEST PROFILE		
	LURC Current Harvest Level	ORGANIZED TOWNS Current Harvest Level	STATEWIDE Current Harvest Level	LURC Allowed by Referendum	ORGANIZED TOWNS Current Harvest Level	STATEWIDE PROJECTED HARVEST LEVEL
	Volume in Cords					
SPRUCE-FIR	1,750,000	400,000	2,150,000	750,000	400,000	1,150,000
TOLERANT HARDWOOD	1,000,000	1,200,000	2,200,000	400,000	1,200,000	1,600,000
INTOLERANT HARDWOOD	300,000	300,000	600,000	120,000	300,000	420,000
TOTAL HARDWOOD	1,300,000	1,500,000	2,800,000	520,000	1,500,000	2,020,000
TOTAL SPRUCE-FIR & HARDWOOD	3,050,000	1,900,000	4,950,000	1,270,000	1,900,000	3,170,000
					DIFFERENCE	-1,780,000
					PERCENT DIFFERENCE	-36%

2. Current Wood Supply Allocation

To estimate the economic consequences of changes in wood supply to Maine manufacturers requires an examination of the supply allocation to the different industry sectors (pulp and paper, sawmills, firewood). Table 2 summarizes how much of Maine's spruce-fir and hardwood harvest is processed in Maine, exported out of state without processing, and how much of their supply is imported by Maine manufacturers each year.

TABLE 2. CURRENT PROFILE OF MAINE'S SPRUCE-FIR AND HARDWOOD SUPPLY TO MAINE MANUFACTURERS			
	Spruce-Fir	Hardwood	Total
	5 Year Average Volume in cords (1990 - 1994)		
A. Harvested & Processed in Maine	1,650,054	1,987,285	3,637,339
Percent of Total Processed (F) harvested in Maine			82%
B. Exported from Maine without processing	507,519	120,954	628,473
Percent of Total Harvest (D) exported without processing			14%
C. Firewood (estimated)	NA	700,000	700,000
D. Total Harvest	2,157,573	2,808,239	4,965,812
E. Imported from out of State	318,839	503,572	822,411
Percent of Total Processed (F) imported from out of state			18%
F. Total Processed by Maine Forest Products Industry	1,968,893	2,490,857	4,459,750
Footnotes: D. Total Harvest = A + B + C F. Total Processed = A + E			

Having identified a timber harvest deficit of 1,780,000 cords of spruce-fir and hardwood (see Table 1), it is reasonable to assume that Maine landowners and forest-based manufacturers will attempt to fill the deficit. An obvious step for individual mills is to increase prices to purchase a larger share of the remaining available harvest. In addition, Maine mills are expected to more aggressively pursue wood from outside their traditional source areas, importing larger volumes of wood.

3. Wood Cost Assumptions

An estimate of the overall price change for wood supply to the various forest-based manufacturing sectors is required to conduct the economic impact analysis. The overall price changes depicted in Table 4 for the paper and lumber sectors are built by estimating the change in costs for each supply source, and producing a weighted average change in mill delivered price. These individual supply sources are described below. The three principal components of mill delivered price are: stumpage (standing value of trees), harvesting cost, and transportation cost. This analysis estimates the most obvious cost impacts in these three cost components for each supply source.

LURC Jurisdiction:

The costs of harvesting trees in LURC jurisdiction under the provisions of the referendum will increase as landowners distribute lighter harvests over a broader land area. Requiring light removal harvests will prompt changes in overall harvest techniques and equipment. Existing harvest operations that conduct very light harvest entries experience harvest costs that are approximately 50% higher than harvest operations that remove high volumes per acre. This analysis assumes a more conservative 40% increase in harvesting cost in LURC jurisdiction. It is assumed that stumpage will increase 15% in response to competition for reduced supply. No change in transportation costs were factored in. Administrative costs (including road construction and maintenance) to plan and distribute harvest activities over a larger acreage base are not included in the estimate of mill delivered price.

Organized Towns, Maine:

Wood sources outside the LURC jurisdiction are not subject to the new standards, and will not experience higher harvesting costs. The analysis assumes a 15% increase in stumpage prices in the organized towns, in response to competition for reduced supply. This increase in stumpage value will likely stimulate increased harvesting in the organized towns. As previously cited, it is inappropriate to incorporate additional harvesting in the organized towns to satisfy wood shortfall needs created by enforcing the referendum's provisions in the LURC jurisdiction. The potential for increased transportation costs (depending on the distances from new sources to particular mills) is not included in the estimated mill delivered price.

The calculations to determine average price increases for wood produced in LURC jurisdiction and the organized towns are detailed in Table 3.

Table 3.   Calculations to Determine Mill Delivered Price Change for Wood Harvested in Maine.

| | | | Components of Mill Delivered Price | | | |
		Stumpage	Harvesting Cost	Transportation Cost	Competition Factor	% change in Mill Delivered Price
S/F PULP		Component Share of Mill Delivered Price				(sum of avg. change in component prices)
LURC jurisdiction	Current component share of price (A)	28%	47%	25%	na	
LURC jurisdiction	% change in component price (B)	15%	40%	NC		
LURC jurisdiction	Weighted average change in component price (A x B)	4%	19%	0%	na	23%
Organized towns	Current component share of price (A)	28%	47%	25%	na	
Organized towns	% change in component price (B)	15%	NC	NC		
Organized towns	Weighted average change in component price (A x B)	4%	0%	0%	5%	9%
HARDWOOD PULP						
LURC jurisdiction	Current component share of price (A)	25%	47%	28%	na	
LURC jurisdiction	% change in component price (B)	15%	40%	NC		
LURC jurisdiction	Weighted average change in component price (A x B)	4%	19%	0%	2%	25%
Organized towns	Current component share of price (A)	25%	47%	28%	na	
Organized towns	% change in component price (B)	15%	NC	NC		
Organized towns	Weighted average change in component price (A x B)	4%	0%	0%	5%	9%
S/F SAWLOGS						
LURC jurisdiction	Current component share of price (A)	35%	40%	25%	na	
LURC jurisdiction	% change in component price (B)	15%	40%	NC		
LURC jurisdiction	Weighted average change in component price (A x B)	5%	16%	0%	na	21%
Organized towns	Current component share of price (A)	35%	40%	25%	na	
Organized towns	% change in component price (B)	15%	NC	NC		
Organized towns	Weighted average change in component price (A x B)	5%	0%	0%	2%	7%
HARDWOOD LOGS						
LURC jurisdiction	Current component share of price (A)	32%	40%	28%	na	
LURC jurisdiction	% change in component price (B)	15%	40%	NC		
LURC jurisdiction	Weighted average change in component price (A x B)	5%	16%	0%	na	21%
Organized towns	Current component share of price (A)	32%	40%	28%	na	
Organized towns	% change in component price (B)	15%	NC	NC		
Organized towns	Weighted average change in component price (A x B)	5%	0%	0%	2%	7%

Retaining Existing Export Volumes:
With the exception of exports of the highest value sawlogs going to specialty markets that do not exist in Maine, and where exported volumes originate on lands owned by the destination mills, we assume that current export volumes can be retained in Maine, but only through higher prices. For purposes of this analysis, we assumed that competition for reduced supply will drive up mill delivered price of retained exports by 15%.

New Import Volumes:
New sources of wood from outside of Maine will command higher, more competitive prices to supply more volume to Maine mills. For wood imported to the state, this analysis uses mill delivered price increase of 25% for spruce-fir and 15% for hardwood. Increased import volumes are projected based on available regional supply - it does not include policy reactions other states or provinces might initiate in response to increased demand by Maine manufacturers.

Table 4 summarizes the changes in mill delivered price for each source of spruce-fir and hardwood in both the paper and lumber manufacturing sectors. **The net effect of these changes in mill delivered prices is a 17% increase in the mill delivered price for wood supplied to both the paper and lumber sectors.**

TABLE 4. DETAIL OF MILL DELIVERED PRICE CHANGE FOR PAPER & LUMBER SECTORS IN MAINE

PAPER SECTOR	Volume in cords			SHARE OF		WEIGHTED
SPRUCE-FIR - PULP	5 YR AVG	PROJECTED		PULPWOOD	MILL DELIV.	AVERAGE
TOTAL HARVEST	954,989	506,000		PROCESSED	PRICE	MILL DELIV.
EXPORTED FROM MAINE	-32,548	-32,000		IN MAINE	CHANGE	PRICE CHANGE
HARVESTED & PROCESSED IN MAINE	922,441	474,000	LURC - SHARE	36.8%	23%	8.5%
			ORGANIZED TOWN - SHARE	19.8%	9%	1.8%
IMPORTED FROM OUT OF STATE	244,269	363,043	IMPORTS - SHARE	43.4%	15%	6.5%
TOTAL PROCESSED BY ME. INDUSTRIES	1,166,710	837,043	WEIGHTED AVERAGE PRICE CHANGE, SPRUCE-FIR PULPWOOD			16.8%

PAPER SECTOR	Volume in cords			SHARE OF		WEIGHTED
HARDWOOD - PULP	5 YR AVG	PROJECTED		PULPWOOD	MILL DELIV.	AVERAGE
TOTAL HARVEST	2,248,291	1,616,000		PROCESSED	PRICE	MILL DELIV.
EXPORTED FROM MAINE	-41,210	-14,544	RETAINED EXPORTS - SHARE	IN MAINE 0.9%	CHANGE 15%	PRICE CHANGE 0.1%
FIREWOOD	-700,000	-500,960				
HARVESTED & PROCESSED IN MAINE	1,507,081	1,100,496	LURC - SHARE	16.8%	25%	4.1%
			ORGANIZED TOWN - SHARE	50.5%	9%	4.4%
IMPORTED FROM OUT OF STATE	385,079	534,228	IMPORTS - SHARE	32.7%	25%	8.2%
TOTAL PROCESSED BY ME. INDUSTRIES	1,892,160	1,634,724	WEIGHTED AVERAGE PRICE CHANGE, HARDWOOD PULPWOOD			16.9%

			SPECIES	WEIGHTED	WEIGHTED
		Volume in cords	SHARE OF	AVERAGE	AVERAGE
			PROCESS	PRICE CHANGE	PRICE CHANGE
SPECIES COMBINED FOR PAPER SECTOR		PROJECTED	VOLUME	FOR SPECIES	FOR SECTOR
	SPRUCE-FIR	837,043	34%	16.8%	5.7%
	HARDWOOD	1,634,724	66%	16.9%	11.2%
TOTAL PROCESSED IN MAINE		2,471,767	WEIGHTED AVERAGE PRICE CHANGE, PAPER SECTOR		16.9%

LUMBER SECTOR	Volume in cords			SHARE OF		WEIGHTED
SPRUCE-FIR - SAWLOGS	5 YR AVG	PROJECTED		SAWLOGS	MILL DELIV.	AVERAGE
TOTAL HARVEST	1,202,584	644,000		PROCESSED	PRICE	MILL DELIV.
EXPORTED FROM MAINE	-474,971	-128,800	RETAINED EXPORTS - SHARE	IN MAINE 21.2%	CHANGE 15%	PRICE CHANGE 3.2%
HARVESTED & PROCESSED IN MAINE	727,613	515,200	LURC - SHARE	55.1%	21%	11.3%
			ORGANIZED TOWN - SHARE	29.7%	7%	1.9%
IMPORTED FROM OUT OF STATE	74,570	92,270	IMPORTS - SHARE	15.2%	15%	2.3%
TOTAL PROCESSED BY ME. INDUSTRIES	802,183	607,470	WEIGHTED AVERAGE PRICE CHANGE, SPRUCE-FIR SAWLOGS			18.7%

LUMBER SECTOR	Volume in cords			SHARE OF		WEIGHTED
HARDWOOD - SAWLOGS	5 YR AVG	PROJECTED		SAWLOGS	MILL DELIV.	AVERAGE
TOTAL HARVEST	559,947	404,000		PROCESSED	PRICE	MILL DELIV.
EXPORTED FROM MAINE	-79,744	-41,569	RETAINED EXPORTS - SHARE	IN MAINE 8.0%	CHANGE 15%	PRICE CHANGE 1.2%
FIREWOOD						
HARVESTED & PROCESSED IN MAINE	480,203	362,431	LURC - SHARE	17.5%	21%	3.6%
			ORGANIZED TOWN - SHARE	52.5%	7%	3.4%
IMPORTED FROM OUT OF STATE	118,493	155,454	IMPORTS - SHARE	30.0%	25%	7.5%
TOTAL PROCESSED BY ME. INDUSTRIES	598,696	517,885	WEIGHTED AVERAGE PRICE CHANGE, HARDWOOD SAWLOGS			15.7%

			SPECIES	WEIGHTED	WEIGHTED
		Volume in cords	SHARE OF	AVERAGE	AVERAGE
			PROCESS	PRICE CHANGE	PRICE CHANGE
SPECIES COMBINED FOR LUMBER SECTOR		PROJECTED	VOLUME	FOR SPECIES	FOR SECTOR
	SPRUCE-FIR	607,470	54%	18.7%	10.1%
	HARDWOOD	517,885	46%	15.7%	7.2%
TOTAL PROCESSED IN MAINE		1,125,355	WEIGHTED AVERAGE PRICE CHANGE, LUMBER SECTOR		17.3%

Footnote: Calculation of price changes for wood harvested in LURC jurisdiction and organized towns is detailed in Table 3.

4. Projected Wood Supply Allocation

Table 5 summarizes the projected state-wide supply of spruce-fir and hardwood after market adjustments attempt to maintain supply. The projection in Table 5 is based on a complex matrix of market adjustments. The market adjustments are based on a series of assumptions. This is an essential step in estimating market responses to wood shortages. Market adjustments were made individually for each species/product and export destination or import source. They are based on MFS data on wood imports and exports, as well as on non-random interviews with sources familiar with regional timber inventory and supply. The market adjustments were reviewed by a panel of economists with expertise in Maine's forest-based economy.

TABLE 5. Detail of Current and Projected Supply of Spruce-fir and Hardwood, by Manufacturing Sector

PAPER SECTOR	SPRUCE-FIR All volume in cords 1990 - 1994		FOOT	HARDWOOD All volume in cords 1990 - 1994		FOOT	TOTAL FOR PAPER SECTOR All volume in cords 1990 - 1994	
PULPWOOD	5 YR AVG	PROJECTED	NOTES	5 YR AVG	PROJECTED	NOTES	5 YR AVG	PROJECTED
A. HARVESTED & PROCESSED IN MAINE	922,441	474,000		1,507,081	1,100,496		2,429,522	1,574,496
B. EXPORTED FROM MAINE	32,548	32,000 no change		41,210	14,544	1	73,758	46,544
NEW BRUNSWICK	15,899			15,801			31,700	
QUEBEC	8,080			6,448			14,528	
OTHER CANADA	8,392			14,193			22,585	
NEW HAMPSHIRE	178			4,768			4,946	
C. FIREWOOD	NA	NA		700,000	500,960		700,000	500,960
D. TOTAL HARVEST	954,989	506,000		2,248,291	1,616,000		3,203,280	2,122,000
E. IMPORTED FROM OUT OF STATE	244,269	363,043		385,079	534,228		629,348	897,271
NEW BRUNSWICK	73,174	87,809	2	249,654	299,585	2	322,828	387,394
QUEBEC	27,152	27,152 no change		5,492	5,492 no change		32,644	32,644
OTHER CANADA	16,058	19,270	2	9,603	11,523	2	25,661	30,793
MASSACHUSETTS				1,873	7,493	4	1,873	7,493
NEW HAMPSHIRE	52,487	78,730	3	107,117	187,454	3	159,603	266,184
VERMONT	75,013	150,026	6	8,219	16,438	6	83,232	166,464
CONNECTICUT	57	57		2,047	4,094		2,104	4,151
RHODE ISLAND				1,074	2,149		1,074	2,149
F. TOTAL PROCESSED BY ME. INDUSTRIES	1,166,710	837,043		1,892,160	1,634,724		3,058,870	2,471,767
DIFFERENCE		-329,667			-257,436			-587,103
CHANGE IN SUPPLY		-28.3%			-13.6%			-19.2%

LUMBER SECTOR	SPRUCE-FIR All volume in cords 1990 - 1994		FOOT	HARDWOOD All volume in cords 1990 - 1994		FOOT	TOTAL FOR LUMBER SECTOR All volume in cords 1990 - 1994	
SAWLOGS	5 YR AVG	PROJECTED	NOTES	5 YR AVG	PROJECTED	NOTES	5 YR AVG	PROJECTED
A. HARVESTED & PROCESSED IN MAINE	727,613	515,200		480,204	362,431		1,207,816	877,631
B. EXPORTED FROM MAINE	474,971	128,800	7	79,744	41,569		554,714	170,369
NEW BRUNSWICK	59,384			21,406	10,787	8	80,790	10,787
QUEBEC	303,691			37,486	18,948	8	341,178	18,948
OTHER CANADA	103,208			14,740	7,434	8	117,948	7,434
MICHIGAN				189	136	9	189	136
NEW HAMPSHIRE	336			2,996	2,157	9	3,332	2,157
NEW YORK	0						0	0
OHIO				16	12	9	16	12
VERMONT	198			457	329	9	655	329
WASHINGTON				900	648	9	900	648
WISCONSIN				262	189	9	262	189
CHINA				0	0	9	0	0
JAPAN	2,382			1,095	789	9	3,477	789
MALAYSIA				8	6	9	8	6
SPAIN				6	5	9	6	5
TAIWAN	2,087			103	74	9	2,190	74
TURKEY	3,685			79	57	9	3,764	57
C. na							0	0
D. TOTAL HARVEST	1,202,584	644,000		559,947	404,000		1,762,531	1,048,000
E. IMPORTED FROM OUT OF STATE	74,570	92,270		118,493	155,454		193,063	247,724
NEW BRUNSWICK	63,741	76,489	2	66,396	79,676	2	130,138	156,165
QUEBEC	0	0		2,872	2,872 no change		2,872	2,872
OTHER CANADA	1,631	1,957	2	24,636	29,563	2	26,267	31,521
NEW HAMPSHIRE	9,087	13,630	3	20,275	35,482	5	29,362	49,112
NEW YORK				26	26 no change		26	26
VERMONT	82	165	6	3,548	7,096	6	3,630	7,261
CONNECTICUT	8	8 no change					8	8
MASSACHUSETTS	20	20 no change		740	740 no change		760	760
F. TOTAL PROCESSED BY ME. INDUSTRIES	802,182	607,470		598,697	517,885		1,400,879	1,125,355
DIFFERENCE		-194,713			-80,811			-275,524
CHANGE IN SUPPLY		-24.3%			-13.5%			-19.7%

FOOTNOTES
1. Currently 1.8% of hardwood pulp harvest is exported - reduce to 0.9%.
2. 5 YR AVG X 1.2
3. 5 YR AVG x 1.5
4. 5 YR AVG X 4.0
5. 5 YR AVG X 1.75
6. 5 YR AVG X 2.0
7. Currently 40% of spruce-fir logs are exported - reduce to 20%.
8. Reduce current export rate by 30%.
9. No change in export rate. Reduce projected volume by % change in harvest level, -28%.

Table 6 summarizes the extent to which market adjustments are able to satisfy demand by Maine manufacturers. It provides a summary of the projected supply of spruce-fir and hardwood that was detailed in Table 5, and a comparison to the current supply as provided in Table 2.

Table 6. Summary of Current and Projected Supply of Spruce-fir and Hardwood to Maine Manufacturers	CURRENT			PROJECTED AFTER REFERENDUM		
	Spruce-Fir	Hardwood	Total	Spruce-Fir	Hardwood	Total
	5 Year Average Volume in cords (1990 - 1994)			Volume in cords		
A. Harvested & Processed in Maine	1,650,054	1,987,285	3,637,339	989,200	1,463,000	2,452,200
Percent of Total Processed (F) harvested in Maine			*82%*			*68%*
B. Exported from Maine without processing	507,519	120,954	628,473	160,800	56,113	216,913
Percent of Total Harvests (D) exported without processing			*14%*			*6%*
C. Firewood (estimated)	NA	700,000		NA	501,000	
D. Total Harvest	2,157,573	2,808,238	4,965,811	1,150,000	2,020,000	3,170,000
E. Imported from out of State	318,839	503,572	822,411	455,313	690,000	1,145,313
Percent of Total Processed (F) imported from out of state			*18%*			*32%*
F. Total Processed by ME. Industries	1,968,892	2,490,857	4,459,749	1,444,513	2,153,000	3,597,513
					DIFFERENCE	-862,236
					PERCENT DIFFERENCE	-19%
Footnotes: D. Total Harvest = A + B + C F. Total Processed = A + E						

Summary of Wood Supply Projections

To summarize the changes in Maine's wood supply that might result from imposing the referendum's harvesting restrictions in LURC jurisdiction:

1. Maine could experience a 36% reduction (1,780,000 cords) in the state wide annual harvest of spruce-fir and hardwood.

2. Market adjustments that result in reduced wood exports and increased wood imports will not completely replace the volume reduction - demand for 862,236 cords will remain unmet. Consequently, Maine manufacturers will experience a 19% shortfall in wood supply.

3. The market adjustments mentioned above, coupled with projected increases in the wood harvesting cost in LURC jurisdiction as a result of the referendum restrictions, would increase the mill delivered price of wood by approximately 17% for both the paper sector and the lumber sector.

Economic Impact Analysis
Assessing the impact of changes in wood supply and wood cost
on Maine's overall economy

A. Summary of the Referendum's Economic Impacts

Table 7 below contains a summary of the annual economic impacts that would be felt by the Maine economy as a result of the referendum's passage. The projected baseline level without a referendum passage, as well as the percentage change from the baseline, are provided for employment, as well as for wage and salary income and total output, so that the relative scale of these estimated economic impacts can be judged.

Table 7: Economic Impacts	LUMBER SECTOR	PAPER SECTOR	ALL OTHER SECTORS	TOTAL MAINE ECONOMY
Projected 1997 Employment Level	15,000	15,000	695,000	725,000
Impact on Employment (# of jobs)	-3,800	-3,200	-8,600	-15,600
Impact on Employment (%)	-25%	-21%	-1%	-2%
Projected 1997 Wage & Salary Level	$265 million	$700 million	$10.4 billion	$11.4 billion
Impact on Wage & Salary	-$68 million	-$166 million	-$205 million	-$439 million
Impact on Wage & Salary (%)	-26%	-24%	-2%	-4%
Projected 1997 Output Level (in '87$)	$837 million	$2.8 billion	$35.2 billion	$38.8 billion
Impact on Output (in '87$)	-$213 million	-$645 million	-$490 million	-$1.3 billion
Impact on Output (%)	-25%	-23%	-1%	-3%

The annual estimated employment level would fall by 3,800 jobs in Maine's lumber sector, by 3,200 jobs in Maine's paper sector, and by 15,600 jobs (-2%) for the entire Maine economy. Annual wage and salary for the entire Maine economy would decline by $439 million (-4%). Total Output would decline by $1.3 billion (-3%).

B. Overview

Using the FORMAINE model of Maine's timber resources, the Maine Forest Service estimates the volume of wood harvested annually from Maine's unorganized territories would decline by 1,780,000 cords (of spruce-fir and hardwood combined) if the referendum is passed. This would be a decline of 36% in the current statewide harvest of 4,950,000 cords for these two species groups. Market responses, including the estimated 17% rise mill delivered wood prices, would reduce the shortfall to 19% of current demand.

With a reduced harvest in the unorganized territory, the Maine State Planning Office foresees economic implications at two levels. First, changes in the cost and supply of raw materials will affect firms in the lumber and paper sectors. It is expected that, in response, these firms will make a variety of production decisions as they attempt to maintain their market shares and profitability. In turn, these decisions will have impacts throughout Maine's economy, affecting such basic economic measures as employment and

With a reduced harvest in the unorganized territory, the Maine State Planning Office foresees economic implications at two levels. First, changes in the cost and supply of raw materials will affect firms in the lumber and paper sectors. It is expected that, in response, these firms will make a variety of production decisions as they attempt to maintain their market shares and profitability. In turn, these decisions will have impacts throughout Maine's economy, affecting such basic economic measures as employment and sales (Value of Product). Using the REMI EDFS-53[1] state model of Maine, the impacts can be simulated and quantified, starting with assumptions about the cost and supply of raw materials for the lumber and paper industries. The impacts are tracked over the next five years.

The second level of economic implications involves the medium and long-term investment decisions (both for new plant and equipment and for maintenance of the existing capital stock) that firms will face as they attempt to maintain and grow their shares within the global market for paper and lumber. Since most future capital investment decisions are not now known, even by the corporations who will be making them, the positive or negative implications of the referendum's passage on Maine's future stock of capital investments cannot be sufficiently quantified for simulation through an economic model. However, the Commission on the Future of Maine's Paper Industry has recently completed an in-depth study of Maine's pulp and paper sectors, and some basic conclusions on how the Referendums passage might be likely to further erode Maine's competitiveness for future capital investments may be drawn from that study[2].

C. Modeling of the Referendum's Direct Economic Impacts
The two basic assumptions derived in Section II above, a 19% shortfall in wood supply and a 17% increase in the mill delivered price of wood, provide the basis to structure the input variables that are required to simulate the referendum's effect on Maine's economy, using the REMI EDFS-53 model of Maine.

The 17% increase in price for mill-delivered wood is translated into a *Relative Cost Change* variable[3] for both the lumber and paper sectors, which is used to drive the economic model. This variable reflects the specific share of a firm's total input costs represented by mill-delivered wood in both the paper and lumber sectors in the state.

The 19% shortfall in supply to the paper and lumber sectors translates directly into a decline in output (value of product) that each of these sectors will be able to produce. That is, a 19% shortfall in the raw material will result in a 19% decline in output. Based on 1994's levels of production, the 19% constraint in supply would result in first order annual reductions in sales of $263 million by Maine's lumber industry and $760 million by Maine's paper industry, beginning in the year 1997. As a result of secondary and induced feedback to these industries the total annual sales reduction is estimated by the REMI Economic Model to be $213 million for the lumber sector and $645 million for the paper sector (see Table 7.)

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[1] 53 Sector Forecasting & Simulation Model of the Maine Economy, May 1996, prepared by Regional Economic Models, Inc. of Amherst, Massachusetts.
[2] Diagnostic Review of the Pulp & Paper Industry in Maine, January 1995, Jaakko Poyry Consulting, Tarrytown, New York.
[3] This is accomplished by using REMI's Maine specific technical-coefficients (input-output) matrix, which provides the share of total input costs coming from each of REMI's forty-nine two digit private non-farm SIC (Standard Industrial Classification) code sectors.

TABLE #8: Derivation of Policy Variables
(Economic Modeling Analysis of the Referendum's Direct + Indirect Economic Impacts)

A: Derivation of Relative Cost Change Policy Variables used to Stimulate the REMI Economic Model

	Paper & Pulp Sector	Lumber Sector
Share of Input Costs Attributable to Wood	6.4%	21.9%
Projected Mill Delivered Price Increase*	17.0%	17.0%
Relative Cost Change	1.1%	3.7%

Relative Cost Change = [share of input costs attributable to a particular material input] x [projected price increase for that input]

B: Derivation of Reduced Sales Policy Variables used to Stimulate the REMI Economic Model

	Paper & Pulp Sector	Lumber Sector
Current Timber Consumption (in cords)	3,058,870	1,400,879
Reduced Timber Consumption* (in cords)	(587,103)	(275,524)
Reduced Timber Consumption* (in percent)	-19.2%	-19.7%
1994 Level of Sales (value of product)**	$3,706,150,159	$1,252,673,557
Reduced Sales (in 1994 dollars)	($711,338,461)	($246,375,047)
REMI Price Index (1997/1994)	1.0686	1.0686
Reduced Sales (converted to 1997 dollars)	($760,136,279)	($263,276,375)
Amount of reduced sales due to price increase alone	($14,420,000)	($18,755,000)
Net Reduced Sales (in 1997 dollars)	($745,716,279)	($244,521,375)

Net Reduced Sales = [the difference between (a) the 19% reduction in sales due to the timber constraint and (b) the reduction in sales resulting from the 17% price increase alone. This computation must be done to avoid a double-counting effect when the two cost change variables are combined with the two sales change variables to run an economic simulation with the REMI model.]

Basic Assumptions:

1- Timber supply shortage will lead to a 17% increase in mill delivered prices, as projected by the Maine Forest Service.
2- Increased mill delivered prices will lead to an increase in wood imports to Maine, and a decrease in wood exports from Maine.
3- An increase in wood imports, and a decrease in wood exports will partially mitigate the reduced harvest volume caused by the referendum.
4- The percentage reduction in total available wood supply (after projected import/export adjustments are made) will be directly translated into an equivalent percentage reduction in sales by Maine's lumber and paper sectors.
5- *Immediate Direct Economic Changes:*
   These are assumed to be the average level of permanent annual changes that the lumber & paper sectors will face within the first 5 years after a referendum passage (these do not include significant reductions in capital investment which these sectors might also be expected to face over a longer-term time horizon, which cannot be modeled, but will be discussed as part of the economic impact analysis).

* Source = Maine Forest Service Estimate (including import/export adjustments)
** Source = Census of Maine Manufacturers 1994

Maine State Planning Office (June 28, 1996)

D. Discussion of the Potential Implications of the Referendum's Passage on Future Capital Investments in Maine's Paper and Lumber Sectors

The State Planning Office organized an advisory panel of five outside economists to review the assumptions that were used to model and quantify the referendum's direct economic impacts. This group of economists included the following individuals:
David Brooks, Science Team Leader, US Forest Service, Corvallis Forest Science Lab,
Charles Colgan, Associate Professor of Public Policy and Management, Muskie Institute, University of Southern Maine,
David Field, Chairperson, Department of Forest Management, University of Maine,
Lloyd Irland, President, The Irland Group,
Paul Sendak, Research Forester, US Forest Service, Northeastern Forest Experiment Station.

The five outside economists reviewed the two basic assumptions, a 17% price rise for mill delivered wood and a 19% shortfall in overall wood supply, used by the State Planning Office to estimate the direct statewide economic impacts with the REMI economic model. It was recognized that these basic assumptions were well within the range of feasible outcomes, although it was also recognized that there would be a wide range of market forces, not easily quantified, that would eventually determine the new equilibrium price and supply levels for mill delivered wood.

In addition to the direct statewide impacts estimated by the economic modeling portion of this analysis, it was also unanimously recognized by the group of economists that quantifying the longer term economic impacts of the referendum would not be possible, given the tools, the data, and the time frame that was available for this analysis. However the group of economists felt it was imperative to attempt to qualify rather than quantify the most significant of the potential longer term impacts. These are listed below.

1. Over the longer term (10+ years), the adverse cost and supply factors created by the referendum will discourage future investments by the lumber and paper sectors. Maine is one region among many in North America and the world from which industry (both lumber and paper sector firms) can choose when planning future capital investments. If similar restrictive regulations were applied across a much wider region, such as across all of North America or across all of northeastern Canada and the United States, then Maine would not be placed on a singularly unlevel "playing field". This unique position will adversely impact the ability of Maine firms to compete in a global marketplace.

2. The Jaakko Poyry study (cited earlier) concludes that Maine has not received its share of the paper industry's capital investment dollars over the past decade, and therefore has an older than average set of capital equipment on hand for production. As Maine faces global competition from other states and regions of the world, the state will be experience increasing pressure to become more competitive to be able to draw in new capital investments. The REMI economic model is not capable of modeling the future investment decisions of the lumber and paper sectors or to quantify

how much of those investments Maine may lose as a result of the referendum's passage. However the five economists that were part of our advisory panel agree that it is highly likely that the referendum's passage will erode Maine's ability to compete with other regions that do not have similar constraints. Therefore, in addition to the direct economic impacts quantified in this report, it is likely that future jobs will be lost in Maine as industry's capital stock in Maine is drawn down and investments in new capital equipment go elsewhere.

APPENDIX TABLES

APPENDIX TABLE #1: 17% RAW MATERIAL PRICE RISE, 19% SUPPLY CONSTRAINT

ESTIMATED IMPACTS ON PRIVATE NONFARM EMPLOYMENT (IN THOUSANDS OF PEOPLE)

	1997 FCST	1998 FCST	1999 FCST	2000 FCST	2001 FCST
LUMBER(24)	-3.878	-3.918	-3.906	-3.871	-3.820
FURNITURE(25)	-.013	-.010	-.006	-.002	.000
STONE,CLAY,ETC.(32)	-.028	-.026	-.023	-.019	-.016
PRIMARY METALS(33)	.000	.001	.001	.001	.002
FABRICATED METALS(34	-.014	-.010	-.006	-.002	.000
MACH. & COMPUTERS(35	-.014	-.005	.003	.009	.013
ELECT. EQUIPMENT(36)	-.008	.001	.009	.015	.019
MOTOR VEH.(371)	.000	.000	.001	.001	.001
REST TRANS EQUI(R37)	.019	.050	.076	.096	.108
INSTRUMENTS(38)	-.002	.000	.002	.004	.005
MISC. MANUF.(39)	-.002	.000	.002	.004	.005
FOOD(20)	-.068	-.064	-.058	-.052	-.047
TOBACCO MANUF(21)	.000	.000	.000	.000	.000
TEXTILES(22)	-.012	-.007	-.002	.002	.005
APPAREL(23)	-.004	-.002	-.001	.001	.002
PAPER(26)	-3.518	-3.351	-3.180	-3.019	-2.864
PRINTING(27)	-.055	-.053	-.048	-.044	-.041
CHEMICALS(28)	-.009	-.006	-.004	-.002	.000
PETRO PROD(29)	-.001	-.001	-.001	.000	.000
RUBBER(30)	-.016	-.012	-.009	-.006	-.004
LEATHER(31)	.000	.003	.004	.005	.006
MINING(10,12-14)	-.008	-.007	-.007	-.006	-.005
CONSTRUCTION(15-17)	-1.285	-1.224	-1.112	-1.002	-.899
RAILROAD(40)	-.026	-.024	-.022	-.020	-.018
TRUCKING(42)	-.313	-.304	-.288	-.272	-.257
LOCAL/INTERURBAN(41)	-.027	-.029	-.029	-.029	-.029
AIR TRANSP.(45)	-.010	-.010	-.009	-.008	-.008
OTHER TRSP(44,46,47)	-.038	-.038	-.036	-.034	-.032
COMMUNICATION(48)	-.056	-.053	-.048	-.043	-.039
PUBLIC UTILITIES(49)	-.173	-.169	-.162	-.156	-.149
BANKING(60)	-.135	-.134	-.127	-.120	-.113
INSURANCE(63,64)	-.127	-.123	-.112	-.102	-.094
CREDIT&FIN(61,62,67)	-.031	-.032	-.031	-.031	-.030
REAL ESTATE(65)	-.120	-.109	-.093	-.077	-.062
EATING/DRINKING(58)	-.507	-.514	-.497	-.480	-.464
RESTRETAIL(52-57,59)	-1.445	-1.429	-1.344	-1.262	-1.186
WHOLESALE(50,51)	-.570	-.557	-.526	-.494	-.463
HOTELS(70)	-.040	-.024	-.005	.011	.023
PER SERV/REPR(72,76)	-.204	-.203	-.192	-.182	-.173
PRIV. HOUSEHOLD(88)	-.081	-.081	-.077	-.072	-.069
AUTO REP/SERV(75)	-.136	-.138	-.135	-.132	-.129
MISC. BUSI. SERV(73)	-.375	-.376	-.359	-.343	-.329
AMUSE&RECREATION(79)	-.090	-.087	-.081	-.075	-.070
MOTION PICTURES(78)	-.016	-.016	-.015	-.014	-.013
MEDICAL(80)	-.769	-.765	-.738	-.716	-.699
MISC PROF(81,87,89)	-.429	-.418	-.386	-.357	-.330
EDUCATION(82)	-.239	-.224	-.210	-.197	-.186
NON-PROFIT(83,84,86)	-.303	-.312	-.309	-.306	-.304
AGRI/F/F SERV(07-09)	-.699	-.692	-.673	-.653	-.630
TOTAL	-15.874	-15.503	-14.765	-14.052	-13.383

APPENDIX TABLE #2: 17% RAW MATERIAL PRICE RISE, 19% SUPPLY CONSTRAINT

ESTIMATED IMPACTS ON OUTPUT OF LOCAL INDUSTRIES (BILLIONS 87$)

	1997 FCST	1998 FCST	1999 FCST	2000 FCST	2001 FCST
LUMBER(24)	-.21308	-.21668	-.21845	-.21901	-.21868
FURNITURE(25)	-.00081	-.00061	-.00039	-.00020	-.00005
STONE,CLAY,ETC.(32)	-.00250	-.00240	-.00213	-.00188	-.00165
PRIMARY METALS(33)	-.00001	.00005	.00010	.00015	.00018
FABRICATED METALS(34	-.00151	-.00115	-.00076	-.00043	-.00018
MACH. & COMPUTERS(35	-.00236	-.00107	.00021	.00130	.00214
ELECT. EQUIPMENT(36)	-.00103	-.00010	.00082	.00160	.00220
MOTOR VEH.(371)	.00000	.00005	.00010	.00014	.00016
REST TRANS EQUI(R37)	.00166	.00440	.00673	.00844	.00954
INSTRUMENTS(38)	-.00017	.00002	.00019	.00034	.00044
MISC. MANUF.(39)	-.00011	-.00003	.00005	.00012	.00017
FOOD(20)	-.00886	-.00857	-.00796	-.00742	-.00700
TOBACCO MANUF(21)	.00000	.00000	.00000	.00000	.00000
TEXTILES(22)	-.00118	-.00076	-.00033	.00003	.00029
APPAREL(23)	-.00033	-.00023	-.00011	-.00001	.00006
PAPER(26)	-.64468	-.63352	-.62141	-.60895	-.59644
PRINTING(27)	-.00376	-.00374	-.00356	-.00337	-.00322
CHEMICALS(28)	-.00123	-.00095	-.00068	-.00045	-.00027
PETRO PROD(29)	-.00023	-.00021	-.00018	-.00014	-.00011
RUBBER(30)	-.00191	-.00162	-.00128	-.00099	-.00076
LEATHER(31)	.00000	.00021	.00041	.00057	.00068
MINING(10,12-14)	-.00029	-.00028	-.00026	-.00024	-.00022
CONSTRUCTION(15-17)	-.09766	-.09360	-.08588	-.07829	-.07100
RAILROAD(40)	-.00334	-.00322	-.00307	-.00292	-.00278
TRUCKING(42)	-.02317	-.02346	-.02328	-.02306	-.02287
LOCAL/INTERURBAN(41)	-.00064	-.00068	-.00067	-.00066	-.00065
AIR TRANSP.(45)	-.00113	-.00113	-.00109	-.00105	-.00102
OTHER TRSP(44,46,47)	-.00285	-.00282	-.00270	-.00259	-.00248
COMMUNICATION(48)	-.01304	-.01285	-.01214	-.01146	-.01087
PUBLIC UTILITIES(49)	-.03534	-.03549	-.03501	-.03449	-.03396
BANKING(60)	-.01045	-.01067	-.01040	-.01010	-.00981
INSURANCE(63,64)	-.01090	-.01083	-.01017	-.00953	-.00897
CREDIT&FIN(61,62,67)	-.00291	-.00313	-.00318	-.00322	-.00326
REAL ESTATE(65)	-.03378	-.03339	-.03113	-.02862	-.02597
EATING/DRINKING(58)	-.01248	-.01268	-.01238	-.01206	-.01176
RESTRETAIL(52-57,59)	-.05290	-.05344	-.05182	-.05014	-.04852
WHOLESALE(50,51)	-.04985	-.04961	-.04811	-.04645	-.04479
HOTELS(70)	-.00072	-.00046	-.00017	.00009	.00028
PER SERV/REPR(72,76)	-.00566	-.00568	-.00544	-.00520	-.00497
PRIV. HOUSEHOLD(88)	-.00056	-.00057	-.00056	-.00054	-.00052
AUTO REP/SERV(75)	-.01051	-.01068	-.01052	-.01034	-.01017
MISC. BUSI. SERV(73)	-.01298	-.01307	-.01260	-.01213	-.01173
AMUSE&RECREATION(79)	-.00276	-.00271	-.00257	-.00243	-.00232
MOTION PICTURES(78)	-.00050	-.00050	-.00048	-.00046	-.00045
MEDICAL(80)	-.03138	-.03143	-.03064	-.03001	-.02951
MISC PROF(81,87,89)	-.02099	-.02064	-.01931	-.01802	-.01686
EDUCATION(82)	-.00627	-.00590	-.00554	-.00520	-.00493
NON-PROFIT(83,84,86)	-.00907	-.00935	-.00927	-.00920	-.00913
AGRI/F/F SERV(07-09)	-.01419	-.01387	-.01338	-.01284	-.01228
TOTAL	-1.348	-1.329	-1.290	-1.251	-1.214

APPENDIX TABLE #4: 17% RAW MATERIAL PRICE RISE, 19% SUPPLY CONSTRAINT

ESTIMATED IMPACTS ON WAGE AND SALARY DISBURSEMENTS
 (IN BILLIONS OF NOMINAL DOLLARS)

	1997 FCST	1998 FCST	1999 FCST	2000 FCST	2001 FCST
LUMBER(24)	-.06819	-.07147	-.07399	-.07594	-.07754
FURNITURE(25)	-.00038	-.00041	-.00039	-.00033	-.00026
STONE,CLAY,ETC.(32)	-.00068	-.00074	-.00072	-.00067	-.00060
PRIMARY METALS(33)	-.00008	-.00011	-.00010	-.00009	-.00007
FABRICATED METALS(34	-.00081	-.00093	-.00091	-.00082	-.00069
MACH. & COMPUTERS(35	-.00137	-.00139	-.00121	-.00094	-.00065
ELECT. EQUIPMENT(36)	-.00174	-.00183	-.00165	-.00136	-.00102
MOTOR VEH.(371)	-.00005	-.00004	-.00003	-.00001	.00000
REST TRANS EQUI(R37)	-.00277	-.00223	-.00134	-.00032	.00066
INSTRUMENTS(38)	-.00019	-.00017	-.00013	-.00008	-.00003
MISC. MANUF.(39)	-.00010	-.00011	-.00010	-.00008	-.00005
FOOD(20)	-.00211	-.00242	-.00248	-.00241	-.00227
TOBACCO MANUF(21)	.00000	.00000	.00000	.00000	.00000
TEXTILES(22)	-.00080	-.00098	-.00098	-.00088	-.00073
APPAREL(23)	-.00022	-.00029	-.00030	-.00028	-.00024
PAPER(26)	-.16584	-.16428	-.16220	-.15974	-.15697
PRINTING(27)	-.00199	-.00231	-.00238	-.00233	-.00221
CHEMICALS(28)	-.00062	-.00063	-.00058	-.00051	-.00043
PETRO PROD(29)	-.00010	-.00010	-.00010	-.00008	-.00007
RUBBER(30)	-.00086	-.00101	-.00102	-.00095	-.00084
LEATHER(31)	-.00040	-.00053	-.00054	-.00047	-.00038
MINING(10,12-14)	-.00017	-.00017	-.00016	-.00015	-.00014
CONSTRUCTION(15-17)	-.02424	-.02528	-.02490	-.02398	-.02272
RAILROAD(40)	-.00144	-.00147	-.00144	-.00138	-.00130
TRUCKING(42)	-.00684	-.00745	-.00761	-.00754	-.00733
LOCAL/INTERURBAN(41)	-.00050	-.00059	-.00064	-.00065	-.00066
AIR TRANSP.(45)	-.00038	-.00043	-.00044	-.00043	-.00041
OTHER TRSP(44,46,47)	-.00083	-.00098	-.00104	-.00105	-.00103
COMMUNICATION(48)	-.00304	-.00332	-.00332	-.00318	-.00297
PUBLIC UTILITIES(49)	-.00767	-.00809	-.00820	-.00816	-.00804
BANKING(60)	-.00461	-.00531	-.00549	-.00543	-.00523
INSURANCE(63,64)	-.00649	-.00747	-.00767	-.00750	-.00711
CREDIT&FIN(61,62,67)	-.00124	-.00149	-.00160	-.00164	-.00164
REAL ESTATE(65)	-.00106	-.00123	-.00125	-.00119	-.00108
EATING/DRINKING(58)	-.00643	-.00767	-.00814	-.00825	-.00811
RESTRETAIL(52-57,59)	-.02537	-.02916	-.03015	-.02985	-.02874
WHOLESALE(50,51)	-.01903	-.02105	-.02153	-.02125	-.02050
HOTELS(70)	-.00102	-.00122	-.00118	-.00103	-.00081
PER SERV/REPR(72,76)	-.00189	-.00219	-.00229	-.00229	-.00223
PRIV. HOUSEHOLD(88)	-.00084	-.00097	-.00101	-.00100	-.00096
AUTO REP/SERV(75)	-.00209	-.00243	-.00260	-.00266	-.00267
MISC. BUSI. SERV(73)	-.00569	-.00654	-.00689	-.00699	-.00692
AMUSE&RECREATION(79)	-.00113	-.00127	-.00131	-.00131	-.00127
MOTION PICTURES(78)	-.00025	-.00028	-.00029	-.00029	-.00028
MEDICAL(80)	-.03493	-.03711	-.03763	-.03747	-.03694
MISC PROF(81,87,89)	-.01455	-.01526	-.01510	-.01461	-.01397
EDUCATION(82)	-.00608	-.00607	-.00600	-.00590	-.00581
NON-PROFIT(83,84,86)	-.00773	-.00857	-.00897	-.00915	-.00922
AGRI/F/F SERV(07-09)	-.00422	-.00450	-.00463	-.00468	-.00466
TOTAL	-.439	-.460	-.463	-.457	-.447

APPENDIX TABLE #3: 17% RAW MATERIAL PRICE RISE, 19% SUPPLY CONSTRAINT

ESTIMATED IMPACTS ON GRP (VALUE ADDED): OUTPUT EXCLUDING INTERMEDIATE INPUTS
(IN BILLIONS OF 87$)

	1997 FCST	1998 FCST	1999 FCST	2000 FCST	2001 FCST
LUMBER(24)	-.05951	-.06105	-.06210	-.06281	-.06326
FURNITURE(25)	-.00035	-.00026	-.00017	-.00009	-.00002
STONE,CLAY,ETC.(32)	-.00104	-.00097	-.00084	-.00073	-.00062
PRIMARY METALS(33)	.00000	.00002	.00003	.00004	.00005
FABRICATED METALS(34	-.00068	-.00051	-.00033	-.00019	-.00008
MACH. & COMPUTERS(35	-.00135	-.00062	.00012	.00077	.00128
ELECT. EQUIPMENT(36)	-.00054	-.00005	.00043	.00084	.00115
MOTOR VEH.(371)	.00000	.00002	.00004	.00005	.00006
REST TRANS EQUI(R37)	.00093	.00247	.00375	.00470	.00529
INSTRUMENTS(38)	-.00009	.00001	.00010	.00018	.00023
MISC. MANUF.(39)	-.00005	-.00001	.00002	.00005	.00008
FOOD(20)	-.00231	-.00220	-.00201	-.00184	-.00170
TOBACCO MANUF(21)	.00000	.00000	.00000	.00000	.00000
TEXTILES(22)	-.00044	-.00028	-.00012	.00001	.00010
APPAREL(23)	-.00011	-.00008	-.00004	.00000	.00002
PAPER(26)	-.29180	-.28675	-.28124	-.27554	-.26982
PRINTING(27)	-.00198	-.00197	-.00187	-.00177	-.00169
CHEMICALS(28)	-.00057	-.00044	-.00031	-.00020	-.00012
PETRO PROD(29)	-.00005	-.00004	-.00003	-.00003	-.00002
RUBBER(30)	-.00085	-.00073	-.00058	-.00045	-.00035
LEATHER(31)	.00000	.00004	.00007	.00009	.00010
MINING(10,12-14)	-.00022	-.00022	-.00020	-.00018	-.00017
CONSTRUCTION(15-17)	-.04630	-.04427	-.04052	-.03685	-.03334
RAILROAD(40)	-.00240	-.00231	-.00219	-.00208	-.00197
TRUCKING(42)	-.01348	-.01350	-.01324	-.01296	-.01270
LOCAL/INTERURBAN(41)	-.00056	-.00059	-.00058	-.00056	-.00055
AIR TRANSP.(45)	-.00044	-.00044	-.00042	-.00040	-.00039
OTHER TRSP(44,46,47)	-.00120	-.00120	-.00116	-.00112	-.00108
COMMUNICATION(48)	-.00959	-.00972	-.00944	-.00915	-.00891
PUBLIC UTILITIES(49)	-.02166	-.02177	-.02148	-.02117	-.02086
BANKING(60)	-.00244	-.00234	-.00213	-.00192	-.00172
INSURANCE(63,64)	-.00389	-.00386	-.00362	-.00339	-.00319
CREDIT&FIN(61,62,67)	-.00190	-.00210	-.00219	-.00227	-.00236
REAL ESTATE(65)	-.02735	-.02698	-.02511	-.02304	-.02087
EATING/DRINKING(58)	-.00564	-.00567	-.00547	-.00528	-.00509
RESTRETAIL(52-57,59)	-.03658	-.03712	-.03616	-.03515	-.03417
WHOLESALE(50,51)	-.03684	-.03698	-.03617	-.03522	-.03425
HOTELS(70)	-.00042	-.00026	-.00009	.00005	.00015
PER SERV/REPR(72,76)	-.00274	-.00274	-.00261	-.00248	-.00236
PRIV. HOUSEHOLD(88)	-.00056	-.00057	-.00056	-.00054	-.00052
AUTO REP/SERV(75)	-.00433	-.00443	-.00440	-.00435	-.00431
MISC. BUSI. SERV(73)	-.00903	-.00913	-.00883	-.00854	-.00829
AMUSE&RECREATION(79)	-.00174	-.00170	-.00161	-.00152	-.00144
MOTION PICTURES(78)	-.00029	-.00029	-.00028	-.00027	-.00027
MEDICAL(80)	-.01745	-.01746	-.01701	-.01664	-.01635
MISC PROF(81,87,89)	-.01277	-.01236	-.01139	-.01047	-.00964
EDUCATION(82)	-.00288	-.00267	-.00246	-.00228	-.00212
NON-PROFIT(83,84,86)	-.00454	-.00469	-.00466	-.00463	-.00461
AGRI/F/F SERV(07-09)	-.00854	-.00837	-.00809	-.00778	-.00745
TOTAL	-.637	-.627	-.607	-.587	-.568

APPENDIX TABLE #5: 17% RAW MATERIAL PRICE RISE, 19% SUPPLY CONSTRAINT

ESTIMATED ECONOMIC IMPACTS: OVERALL SUMMARY TABLE

	1997 FCST	1998 FCST	1999 FCST	2000 FCST	2001 FCST
TOTAL EMPLOYMENT	-16.223	-16.271	-15.786	-15.275	-14.762
EMP % OF US	-.011	-.011	-.010	-.010	-.009
TOT PRIV NF EMPLYT	-15.874	-15.503	-14.765	-14.052	-13.383
PR NF EMP % OF US	-.012	-.012	-.011	-.011	-.010
GRP 87$*(PCE-P)	-.808	-.830	-.834	-.836	-.838
PERSONAL INCOME	-.522	-.594	-.632	-.658	-.674
PERS INC % OF US	-.008	-.009	-.009	-.009	-.008
DISPOSABLE INCOME	-.451	-.516	-.551	-.575	-.591
PCE-PRICE INDX-87	-.289	-.433	-.491	-.503	-.490
REAL DISP INCOME	-.314	-.333	-.340	-.345	-.348
POPULATION	-5.613	-12.313	-16.293	-19.451	-21.836
POP AS % OF US	-.002	-.005	-.006	-.007	-.008

NOTE - For all tables: EMPLOYMENT & POPULATION are in THOUSANDS of people,
       DOLLAR concepts are in BILLIONS OF 87$* (LOCAL PCE-PRICE) unless
       indicated, and PER CAPITA concepts are in THOUSANDS OF REAL DOLLARS.

INDEX TO AVAILABLE TABLES